

**U.S. DEPARTMENT OF ENERGY  
DEPARTMENT-WIDE  
FUNCTIONAL AREA QUALIFICATION STANDARD**

# **ENVIRONMENTAL RESTORATION QUALIFICATION STANDARD**

**Defense Nuclear Facilities Technical Personnel**



**U.S. Department of Energy  
Washington, D.C. 20585**

**May 1995**

## **Approval and Concurrence**

The Assistant Secretary for Environmental Management is the Management Sponsor for the Department-wide Environmental Restoration Qualification Standard. The Management Sponsor is responsible for reviewing the Qualification Standard to ensure that the technical content is accurate and adequate for Department-wide application. The Management Sponsor, in coordination with the Human Resources organization, is also responsible for ensuring that the Qualification Standard is maintained current. Concurrence with this Qualification Standard by the Assistant Secretary for Environmental Management is indicated by the signature below.

The Technical Personnel Program Coordinator (TPPC) is responsible for coordinating the consistent development and implementation of the Technical Qualification Program throughout the Department of Energy. Concurrence with this Qualification Standard by the Technical Personnel Program Coordinator is indicated by the signature below.

The Technical Excellence Executive Committee (TEEC) consists of senior Department of Energy managers. This Committee is responsible for reviewing and approving the Qualification Standard for Department-wide application. Approval of this Qualification Standard by the Technical Excellence Executive Committee is indicated by the signature below.

**NOTE:** The signatures below reflect concurrence and approval of this Qualification Standard for interim Implementation. Final concurrence and approval will occur in December 1995, pending comments received based upon implementation.

### **CONCURRENCE:**

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Assistant Secretary for  
Environmental Management

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Technical Personnel Program  
Coordinator

### **APPROVAL:**

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Chairman  
Technical Excellence Executive Committee

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**U.S. DEPARTMENT OF ENERGY  
FUNCTIONAL AREA QUALIFICATION STANDARD**

**FUNCTIONAL AREA**

**Environmental Restoration**

**PURPOSE**

The Technical Qualification Program is divided into three levels of technical competence and qualification. The General Technical Base Qualification Standard establishes the base technical competence required of all Department of Energy defense nuclear facility technical personnel. The Functional Area Qualification Standards build on the requirements of the General Technical Base Qualification Standard and establish Department-wide functional competence requirements in each of the identified functional areas. Office/facility-specific qualification standards establish unique operational competency requirements at the Headquarters or Field element, site, or facility level.

The Environmental Restoration Functional Area Qualification Standard establishes common functional area competency requirements for all Department of Energy fire protection engineer technical personnel who provide management oversight or direction impacting the safe operation of defense nuclear facilities. Satisfactory and documented completion of the competency requirements contained in this Standard ensures that technical employees possess the minimum requisite competence to fulfill their functional area duties and responsibilities. Additionally, these competency requirements provide the functional foundation to assure successful completion of the appropriate Office/facility-specific qualification standard.

**APPLICABILITY**

This Standard applies to all Department of Energy Environmental Restoration technical personnel who provide management direction or oversight impacting the safe operation of defense nuclear facilities. Personnel designated by Headquarters or Field element line management as participants in the Technical Qualification Program are required to meet the requirements of this Standard as defined in DOE Order 3410, Training.

**IMPLEMENTATION REQUIREMENTS**

The competencies contained in the Standard are divided into the following four categories:

1. General Technical
2. Regulatory
3. Administrative
4. Management, Assessment, and Oversight

Each of the categories is defined by one or more competency statements indicated by bold print. The competency statements define the expected knowledge and/or skill that an individual must possess, and are requirements. Each of the competency statements is further explained by a

listing of supporting knowledge and/or skill statements. The supporting knowledge and/or skill statements are not requirements and do not necessarily have to be fulfilled to meet the intent of the competency.

The competencies identify a familiarity level, working level, or expert level of knowledge; or they require the individual to demonstrate the ability to perform a task or activity. These levels are defined as follows:

**Familiarity level** is defined as basic knowledge of or exposure to the subject or process adequate to discuss the subject or process with individuals of greater knowledge.

**Working level** is defined as the knowledge required to monitor and assess operations/activities, to apply standards of acceptable performance, and to reference appropriate materials and/or expert advice as required to ensure the safety of Departmental activities.

**Expert level** is defined as a comprehensive, intensive knowledge of the subject or process sufficient to provide advice in the absence of procedural guidance.

**Demonstrate the ability** is defined as the actual performance of a task or activity in accordance with policy, procedures, guidelines, and/or accepted industry or Department practices.

Headquarters and Field elements shall establish a program and process to ensure that all defense nuclear facility technical personnel required to participate in the Technical Qualification Program meet the competency requirements contained in this Standard. Documentation of the completion of the requirements of this Standard shall be included in the employee's training and qualification record.

In select cases, it may necessary to exempt an individual from completing one or more of the competencies in this Functional Area Qualification Standard. Exemptions from individual competencies shall be justified and documented in accordance with DOE Order 3410, Training. Exemptions shall be requested by the individual's immediate supervisor, and approved one level above the individual's immediate supervisor.

Equivalencies may be granted for individual competencies based upon an objective evaluation of the employee's prior education, experience, and/or training. Documentation of equivalencies shall indicate how the competency requirements have been met. The supporting knowledge and/or skill statements may be considered when evaluating an individual's ability with respect to each competency requirement.

Training shall be provided to employees in the Technical Qualification Program who do not meet the competencies contained in the qualification standard. Departmental training will be based upon supporting knowledge and/or skill statements similar to the ones listed for each of the competency statements. Headquarters and Field elements should use the supporting knowledge and/or skill statements as a basis for evaluating the content of any training courses used to provide individuals with the requisite knowledge and/or skill required to meet the qualification standard competency statements.

## **DUTIES AND RESPONSIBILITIES**

The following are duties and responsibilities normally expected of defense nuclear facility technical personnel assigned to the environmental restoration functional area:

- A. Maintain communication with Headquarters, field elements, regulatory agencies, the public and other stakeholders.
- B. Inform Department of Energy management of applicable environmental restoration project status, activities, and issues.
- C. Plan, observe and evaluate environmental restoration activities and contractor performance to ensure the adequacy and effectiveness of:
  - Technical performance
  - Policies and procedures
  - Management and financial controls
  - Worker training and qualification programs
  - Corrective actions
  - Worker and public health and safety programs
  - Environmental protection & regulatory compliance
  - Pollution Prevention and Waste Minimization
- D. Develop, review, and assess environmental restoration documentation.
- E. Serve as a Department of Energy technical point-of-contact and/or subject matter expert for assigned functional environmental restoration activities.
- F. Facilitate the notification and reporting of occurrences.
- G. Develop, manage, and negotiate regulatory strategies, agreements, and permits.
- H. Resolve or facilitate the resolution of environmental restoration issues.
- I. Develop or participate in the development, implementation, and evaluation of environmental restoration strategic, baseline, project, and program plans.
- J. Promote the sharing of information and technology.
- K. Participate in technology evaluations.

Additional duties and responsibilities specific to the site, the facility, the operational activities, and/or the involved organizations shall be contained in the facility-specific qualification standard(s).

## **BACKGROUND AND EXPERIENCE**

The U. S. Office of Personnel Management's Qualification Standards Handbook establishes minimum education, training, experience, or other relevant requirements applicable to a particular occupational series/grade level, as well as alternatives to meeting specified requirements.

The preferred education and experience for environmental restoration personnel is:

1. Education:

Bachelor of Science degree in engineering, science, or a related discipline; or meeting the alternative requirements specified for engineers or scientists in the Qualifications Standards Handbook.

2. Experience:

Industrial, military, Federal, State or other directly related background that has provided specialized experience in environmental restoration. Specialized experience may be demonstrated through possession of the competencies outlined in this Standard.

**REQUIRED COMPETENCIES**

The competencies contained in this Standard are distinct from those competencies contained in the General Technical Base Qualification Standard. All environmental compliance personnel must complete the competency requirements of the General Technical Base Qualification Standard prior to or in parallel with the completion of the competency requirements contained in this Standard. Each of the competency statements defines the level of expected knowledge and/or skill that an individual is required to possess to meet the intent of this Standard. The supporting knowledge and/or skill statements further describe the intent of the competency statements but are not requirements.

## **1. GENERAL TECHNICAL**

### **1.1 Environmental restoration personnel shall demonstrate a familiarity level knowledge of chemistry fundamentals.**

#### Supporting Knowledge and/or Skills

- a. Describe the classes of chemicals and hazardous substances.
- b. Explain the Environmental Protection Agency's analytical methods and perform an evaluation of one of the methods.
- c. Discuss the following terms:
  - Density
  - Parts per million (ppm)
- d. Define the following terms:
  - Acid
  - Base
  - pOH
  - Salt
  - pH
  - Metal
  - Volatile organic
  - Semivolatile organic

### **1.2 Environmental restoration personnel shall demonstrate a familiarity level knowledge of chemistry fundamentals in corrosion and water treatment.**

#### Supporting Knowledge and/or Skills

- a. Explain the process of general corrosion of iron and steel when exposed to water.
- b. Discuss the two conditions that can cause galvanic corrosion.
- c. Discuss the following types of specialized corrosion:
  - Pitting corrosion
  - Stress corrosion cracking
  - Crevice corrosion
- d. Explain the ion exchange process.

### **1.3 Environmental restoration personnel shall demonstrate a familiarity level knowledge of chemistry fundamentals as related to safety .**

Supporting Knowledge and/or Skills

- a. Discuss the hazards associated with the use of corrosives (acids and alkalies).
- b. Describe the general safety precautions necessary for the handling, storage, and disposal of corrosives.
- c. Discuss the general safety precautions regarding hazardous substances including radioactive substances.
- d. Describe the criteria used to determine if a compound is a health hazard and discuss the methods by which toxic compounds may enter the body.
- e. Discuss the general safety precautions regarding the use, handling, and storage of compressed gases, specifically including: hydrogen, oxygen, and nitrogen.
- f. Discuss the safety precautions for working with cryogenic liquids.
- g. Explain the difference between a flammable liquid and a combustible liquid.
- h. Describe the general safety precautions regarding the use, handling, and storage of flammable and combustible, corrosive, reactive, and radioactive liquids.

**1.4 Environmental restoration personnel shall demonstrate a familiarity level knowledge of reading and plotting graphs and interpreting graphical data.**

Supporting Knowledge and/or Skills

- a. Solve for the unknown given a linear equation with multiple units, such as Environmental Protection Agency risk equations.
- b. Given a graph, interpret meaning of slope and intercept, such as slope factor for a carcinogenic chemical.
- c. Interpret data on a simple graph, such as time/concentration.
- d. Given a table of data, plot the data points on a Cartesian coordinate graph.
- e. Given a table of data, plot the data points on a logarithmic coordinate graph.
- f. Given a graph, determine the slope of a line.

**1.5 Environmental restoration personnel shall demonstrate a familiarity level knowledge of problem-solving involving probability and simple statistics.**

Supporting Knowledge and/or Skills

- a. State the definition of the following statistical terms:
  - Mean
  - Variance
  - Mean variance
  - Median
  - Mode
- b. Explain the structure and function of a Bell Curve.
- c. Calculate the mathematical mean of a given set of data.
- d. Calculate the mathematical mean variance of a given set of data.
- e. Given the data, calculate the probability of an event.

**1.6 Environmental restoration personnel shall demonstrate a working level knowledge of the units of measurement and conversion between English and SI systems.**

Supporting Knowledge and/or Skills

- a. Define the three fundamental dimensions: length, mass, and time.
- b. List standard units of the fundamental dimensions for each of the following systems:
  - International System of Units (SI)
  - English System
- c. Differentiate between fundamental and derived measurements.
- d. Given appropriate conversion tables, convert between English and SI units of length.
- e. Given appropriate conversion tables, convert between English and SI units of mass and concentration (ppm, ppb, mg/l,  $\mu\text{g/l}$ ,  $\mu\text{g/kg}$ , nCi/g, pCi/g, etc.).

**1.7 Environmental restoration personnel shall demonstrate a familiarity level knowledge of the basic principles and concepts of soil science.**

Supporting Knowledge and/or Skills

- a. List the different soil textures and soil structures.
- b. Define soil humus and explain the role of humus in chemical reactions.

- c. Define erosion and describe the characteristics and effects of water and wind erosion.
- d. Describe mass wasting and cite an example.
- e. Describe the following processes and explain how water and soil interact in each:
  - Infiltration and percolation
  - Groundwater recharge
  - Run-off
  - Evapotranspiration
  - Unsaturated flow
- f. Describe the uncertainties of the universal soil loss equation.

**1.8 Environmental restoration personnel shall demonstrate a familiarity level knowledge of the basic principles and concepts of hydrology.**

Supporting Knowledge and/or Skills

- a. Define hydrology.
- b. Describe the hydrologic cycle.
- c. Define the following hydrologic terms and describe the relationships between them:
  - Precipitation
  - Streamflow
  - Evaporation
  - Transpiration
  - Subsurface water (ground water)
  - Sedimentation
  - Vadose Zone
  - Saturated Zone
  - Attenuation
  - Dispersion
  - Permeability
  - Porosity
  - Conductivity
- d. Describe the flow of groundwater in the subsurface and discuss the importance of this to environmental restoration.

**1.9 Environmental restoration personnel shall demonstrate a familiarity level knowledge of the basic principles and concepts of geology.**

Supporting Knowledge and/or Skills

- a. Discuss the following types of rocks, cite examples of each and how it relates to water, vapor, or contaminant movement:
  - Igneous
  - Sedimentary
  - Metamorphic
- b. Describe the elastic properties of rocks.
- c. Describe the strength properties of rocks.
- d. Describe the geometry and properties of the following rock masses and effects on contaminant movement:
  - Folds
  - Faults
  - Structural discontinuities
  - Shear strength of discontinuities
  - Residual stress
  - Sheet joints
  - Fractures
- e. Discuss the use of geological and geotechnical maps.
- f. Describe a geomorphic system and cite an example.
- g. Discuss weathering and its significance in geotechnical engineering.
- h. Discuss tests that assess weatherability.
- i. Describe the process for logging rock cores.

**1.10 Environmental restoration personnel shall demonstrate a working level knowledge of the principles and concepts of waste management and remediation technologies.**

Supporting Knowledge and/or Skills

- a. Discuss the requirements of DOE Order 5820.2A, Radioactive Waste Management.
- b. Describe the various methods of waste treatment and effectiveness/applicability to various waste types.
- c. Discuss the purpose and requirements of DOE Order 5480.3, Safety Requirements for the Packaging and Transportation of Hazardous Materials, Hazardous Substances, and Hazardous Wastes.
- d. Describe the various methods of waste disposal and their applicability to various waste types.
- e. Describe the various methods of waste storage and their applicability to various waste types.
- f. Discuss the various, currently available, remediation technologies and their applications.

**1.11 Environmental restoration personnel shall demonstrate a familiarity level knowledge of engineering design, and reading and interpreting of engineering and architectural drawings.**

Supporting Knowledge and/or Skills

- a. Define engineering design.
- b. Describe the six basic steps of the design process.
- c. Given an engineering fabrication, construction, or architectural drawing, read and interpret the basic dimensional and tolerance symbology, and basic fabrication, construction, or architectural symbology.

**1.12 Environmental restoration personnel shall demonstrate a familiarity level knowledge of the relationship of each of the following disciplines to environmental restoration:**

- Ecology
- Meteorology
- Hydrology
- Geology
- Geochemistry
- Seismology
- Toxicology

Supporting Knowledge and/or Skills

- a. Describe how each of the listed scientific disciplines contributes to environmental restoration activities.
- b. Describe the interrelationship between the listed scientific disciplines and environmental restoration activities.

**1.13 Environmental restoration personnel shall demonstrate a working level knowledge of environmental monitoring and field data collection techniques.**

Supporting Knowledge and/or Skills

- a. Describe the various types of environmental monitoring and the purpose of each performed at a site.
- b. Describe the equipment used to monitor and the parameters being measured for the following:
  - Air
  - Surface water
  - Ground water
  - Soil
- d. Discuss the following techniques of sampling and monitoring the environment:
  - Analytical laboratory vs. field techniques
  - Well drilling
  - Geophysical or non-intrusive methods
- e. Describe the various analytical and validation methods. Include in the discussion the protocols used and the purpose of a Quality Assurance Project Plan.

**1.14 Environmental restoration personnel shall demonstrate a working level knowledge of the principles, concepts, and requirements of an environmental risk assessment.**

Supporting Knowledge and/or Skills

- a. Define risk assessment, risk management, and risk communication.
- b. Describe the four steps of a risk assessment.
- c. Discuss the part risk assessment plays in the following:
  - Pre-remedial program
  - Removal program
  - Remedial program
- d. Describe how risk assessment helps in site decision-making.

- e. Define baseline risk assessment.
- f. Explain the purpose of:
  - The Human Health Evaluation Manual (Part A) (1989)
  - The Environmental Evaluation Manual (1989)
- g. Describe the process for performing a Toxicity Assessment.
- h. Describe the process for performing an Exposure Assessment.
- i. Describe the process used to characterize risk.
- j. Describe methods for performing pathway modeling. Include in the discussion the advantages and disadvantages of each method.

## 2. REGULATORY

**NOTE:** When Department of Energy directives are referenced in the qualification standard, the most recent revision should be used.

**2.1 Environmental restoration personnel shall demonstrate a working level knowledge of the following National Environmental Policy Act (NEPA) documentation and its applicability to environmental restoration projects:**

- **Implementation Plan**
- **Environmental Impact Statement (EIS)**
- **Environmental Assessment (EA)**
- **Finding Of No Significant Impact (FONSI)**
- **Categorical Exclusion (CX)**
- **Record of Decision (ROD)**
- **Mitigation Action Plan**

Supporting Knowledge and/or Skills

- a. Describe the process for developing the above listed documents. Include a discussion of the format used and any guidance available for each document.
- b. Discuss the requirements for each document and describe the process for reviewing the above listed documents.
- c. Describe the process for performing an assessment of the above listed documents and discuss criteria that could be used during an assessment.
- d. Perform a review/assessment of each of the above listed documents.
- e. Describe the Department's integration policy for the Comprehensive Environmental Response, Compensation, and Liability Act/National Environmental Policy Act, and method for incorporating National Environmental Policy Act values into environmental restoration documentation.
- f. Discuss the relationship between 40 CFR 1500, Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act, and DOE Order 5440.1E, National Environmental Policy Act Compliance Program.

**2.2 Environmental restoration personnel shall demonstrate a working level knowledge of the purpose and process required by the Comprehensive Environmental Response, Compensation, and Liability Act as outlined in the National Contingency Plan.**

Supporting Knowledge and/or Skills

- a. Discuss the criteria set forth in the National Oil and Hazardous Substances Pollution Contingency Plan for the performance of Cleanup Alternative Analysis.
- b. Describe the requirements for public comment as they apply to the Comprehensive Environmental Response, Compensation, and Liability Act activities.
- c. Discuss the purpose and history of the Comprehensive Environmental Response, Compensation, and Liability Act.
- d. Discuss the relationship between the Comprehensive Environmental Response, Compensation, and Liability Act and all other environmental regulations, especially the relationship between the Comprehensive Environmental Response, Compensation, and Liability Act and the Resource Conservation and Recovery Act.

**2.3 Environmental restoration personnel shall demonstrate a working level knowledge of the following document development, review, and assessment under the Comprehensive Environmental Response, Compensation, and Liability Act:**

- Remedial Investigation Feasibility Study Work Plan
- Investigative Work Plan Report
- Permits
- Records of Decision
- Remedial Design
- Remedial Action Work Plan
- Consent Order & Settlement Agreement
- Proposed Plan
- As Reasonable and Appropriate Regulations

Supporting Knowledge and/or Skills

- a. Describe the process for developing the elements of the above listed documents. Include a discussion of the format used and guidance, if any, available for each document.
- b. Discuss the requirements of each document and describe the process for reviewing the above listed documents.
- c. Perform a review/assessment of each of the above listed documents.

**2.4 Environmental restoration personnel shall demonstrate a working level knowledge of the management and negotiation of regulatory agreements and permits.**

Supporting Knowledge and/or Skills

- a. Describe the responsibilities in management of the following documents:
  - Federal Facility Agreements
  - Consent Order & Settlement Agreements
  - Records Of Decision
  - Resource Conservation and Recovery Act Permits
- b. Discuss the requirements and methods of negotiation for the following documents:
  - Federal Facility Agreements
  - Consent Order & Settlement Agreements
  - Records Of Decision
  - Resource Conservation and Recovery Act permit parameters
  - Grant conditions

**2.5 Environmental restoration personnel shall demonstrate a working level knowledge of the Resource Conservation and Recovery Act Corrective Action Process.**

Supporting Knowledge and/or Skills

- a. Describe the purpose and the history of the Resource Conservation and Recovery Act.
- b. Discuss the requirements of 40CFR260, Hazardous Waste Management System - General, through 40CFR270, EPA Administrated Permit Programs: The Hazardous Waste Permit Program, as applied to the field of environmental restoration.
- c. Describe the requirements of 40CFR260, Hazardous Waste Management System - General, through 40CFR270, EPA Administrated Permit Programs: The Hazardous Waste Permit Program, in applying for and developing Resource Conservation and Recovery Act permits.

**2.6 Environmental restoration personnel shall demonstrate a familiarity level knowledge of other environment-related laws and regulations.**

Supporting Knowledge and/or Skills

- a. Explain the purpose and application of the following documents to environmental restoration:
  - Endangered Species Act
  - National Historic Preservation Act
  - Societal Regulations
  - Native American Graves Restoration Act
  - American Indian Religious Freedom Act
  - E.O. Environmental Justice
  - Pollution Prevention
  - Waste Minimization
  - Price Anderson Amendments Act

- b. Describe the purpose, and discuss the general significant requirements associated with the following environmental regulations:
- National Environmental Policy Act
  - Natural Resource Damage Assessment
  - Toxic Substance Control Act
  - Endangered Species Act
  - National Historic Preservation Act
  - National Environmental Policy Act
  - Natural Resource Damage Assessment
  - Toxic Substance Control Act
  - Safe Drinking Water Act
  - Clean Water Act
  - Clean Air Act
  - Atomic Energy Act
  - DOE Natural Resource Trustee Regulation
  - American Indian Treaties
  - E.O. Floodplains and Wetlands
  - Noise
- c. Describe the concept of "Applicable or Relevant and Appropriate Requirements" (ARARs) and how they relate to environmental restoration work.

### 3. ADMINISTRATIVE

**NOTE:** When Department of Energy directives are referenced in the qualification standard, the most recent revision should be used.

**3.1 Environmental restoration personnel shall demonstrate a working level knowledge of methods of communication with Headquarters, field elements, regulatory agencies, the public, and other stakeholders.**

Supporting Knowledge and/or Skills

- a. Describe the Department's organization and discuss the Department's procedures for communicating between elements.
- b. Describe the Department's procedures and policy for communicating with the Environmental Protection Agency and other regulatory agencies.
- c. Demonstrate the ability to present technical ideas in general terms to the public.
- d. Define conflict and discuss the win-lose and win-win methods of conflict resolution.
- e. Discuss the win-lose and win-win methods of conflict resolution.
- f. Discuss the documents that go into an Administrative Record.
- g. Discuss the purpose of the Federal Advisory Committee Act.

**3.2 Environmental restoration personnel shall demonstrate a familiarity level knowledge of data management requirements and quality assurance.**

Supporting Knowledge and/or Skills

- a. Explain the concepts of the following documents as they apply to data quality:
  - DOE Order 5700.6C, Quality Assurance
  - NQA-1, Quality Assurance Program Requirements For Nuclear Facilities
  - QMS 05-80, Quality Assurance Management Plan
  - 10CFR830.120, Quality Assurance Implementation Plan
- b. Discuss the following:
  - Data quality objectives
  - Data quality levels
  - Field and laboratory quality assurance samples and uses
  - Chain of custody
  - Preservation of samples

- Precision
- Accuracy
- Representativeness
- Completeness
- Comparability
- Activity data sheet

**3.3 Environmental restoration personnel shall have a familiarity level knowledge of the Federal budget process.**

Supporting Knowledge and/or Skills

- a. Describe the requirements of 10CFR600.31- Funding.
- b. Discuss the process that the Department uses to fund environmental restoration projects.

## 4. MANAGEMENT, INSPECTION, AND OVERSIGHT

**NOTE:** When Department of Energy directives are referenced in the qualification standard, the most recent revision should be used.

### 4.1 Environmental restoration personnel shall demonstrate a working level knowledge of technology evaluation.

#### Supporting Knowledge and/or Skills

- a. Discuss the Department's policies and procedures for screening technologies.
- b. Describe the process for performing a Cleanup Alternative Analysis.
- c. Conduct a technology evaluation using a Cleanup Alternative Analysis.
- d. Discuss the methods and importance of keeping accurate administrative records.

### 4.2 Environmental restoration personnel shall demonstrate a familiarity level knowledge of the structure of the Environmental Management organization, specifically including the Offices of Environmental Restoration, Waste Management, and Technology Development and any applicable sub-element(s).

#### Supporting Knowledge and/or Skills

- a. Given a current Environmental Management organizational chart, explain the relationship between the organizational elements and describe the functions of each element.
- b. Given a current Department organizational chart, explain the relationships between Departmental elements and environmental restoration.
- c. List other Federal agencies, and/or sub-elements of those agencies, that play a role, both technological and regulatory, in the environmental restoration of Department sites and describe their role(s).
- d. Describe the types and locations of Environmental Management's integrated programs and integrated demonstrations, including industry participants where applicable.
- e. Explain how the Small Business Innovative Research Program functions and how this program can be used to improve private sector awareness of environmental restoration programs.
- f. Describe the methods by which industry can become involved in Environmental Management-related activities, including as a minimum

contracting mechanisms, the Small Business Innovative Research Program, licensing of technology, and Cooperative Research and Development Agreements.

- 4.3 Environmental restoration personnel shall demonstrate a working level knowledge of program/project management necessary to integrate program resources and apply those resources to meet quality, safety, cost, and schedule commitments; as described in Department of Energy (DOE) Order 4700.1, Project Management System, and the Department of Energy (DOE) Technical Standard, DOE-STD-1073-93, Guide for Operational Configuration Management.**

Supporting Knowledge and/or Skills

- a. Explain the purpose of project management.
- b. Describe the life cycle of a typical project.
- c. Describe typical documents and data sources utilized in project management.
- d. Identify and explain the major elements of a project, and discuss their relationship.
- e. Explain the purpose and use of a Project Management Plan (PMP).
- f. Discuss the role of configuration management as it relates to project management.
- g. Describe the purpose and use of work packages and/or planning packages.
- h. Describe the purpose of schedules, and discuss the use of milestones and activities.
- i. Explain the use of a logic diagram.
- j. Describe the "critical path method" of scheduling.
- k. Describe the requirements for project/program files and documentation.
- l. Discuss the requirements to procure external products and services for Department projects.
- m. Describe the methods for procuring other Department or Government products and services.
- n. Describe areas of project management where difficulties are likely to occur.
- o. Describe lessons-learned from previous projects.

**4.4 Environmental restoration personnel shall demonstrate a working level knowledge of financial management necessary to integrate program resources and apply those resources to meet quality, safety, cost, and schedule commitments; as described in Department of Energy (DOE) Notice 4700.5, Project Control System Guidelines.**

Supporting Knowledge and/or Skills

- a. Define and compare the terms "cost estimate" and "budget."
- b. Describe the process for preparing cost estimates and budgets.
- c. Describe and compare labor and non-labor costs.
- d. Describe and compare direct and indirect costs.
- e. Discuss methods of reducing indirect costs.
- f. Discuss the importance of determining the measure for work performed before work starts.
- g. Describe methods for measuring work performed.
- h. Define and explain the relationship between following terms:
  - Budgeted cost of work scheduled (BCWS)
  - Budgeted cost of work performed (BCWP)
  - Actual cost of work performed (ACWP)
- i. Discuss schedule and cost variance.
- j. Given actual project management documentation and data, identify Budgeted cost of work scheduled, Budgeted cost of work performed, Actual cost of work performed, and determine the schedule variance and cost variance.
- k. Describe the types of Earned Value and how they are measured.
- l. Explain what is meant by the term "baseline" as it relates to project management.
- m. Describe the four baselines used in project management.
- n. Describe the types of data required to forecast cost and schedule performance.
- o. Define the term "Estimate at Completion."
- p. Given sample data, calculate Estimate at Completion.
- q. Discuss the importance of formal change control with regard to project management.

- r. Discuss the use of strategic planning, and how such planning relates to ongoing operations and safety of operations.

**4.5 Environmental restoration personnel shall demonstrate a working level knowledge of contract management to establish contractor evaluation requirements, assess contractor performance, and ensure accountability.**

Supporting Knowledge and/or Skills

- a. Discuss the purpose of contracting as it pertains to the operations of Department facilities.
- b. Explain the types of contracts employed by the Department.
- c. Describe the characteristics of the three major contract types utilized within the Department.
- d. Describe the "Accountability Rule" and discuss the role it plays in contract management.
- e. Discuss the roles of Federal and contractor personnel in contract management.
- f. Define the term "Federal Norm" and describe its significance to the Department and contractor activities.
- g. Discuss the "Cost Plus Award Fee" evaluation process, include the development of performance criteria, conduct of the evaluation, and documentation and transmittal requirements for performance.
- h. Discuss typical criteria, the performance measures, and means to communicate the importance of the contractor evaluation performance criteria.
- i. Participate in an actual contractor evaluation performance cycle providing an assessment at the conclusion of the cycle.

**4.6 Environmental restoration personnel shall demonstrate a working level knowledge of communications when working or interacting with the contractor, media, stakeholders, and other internal and external organizations.**

Supporting Knowledge and/or Skills

- a. Discuss the purpose of, and describe the roles and responsibilities of, the environmental restoration personnel for the following:
  - DOE Order 5500.4A, Public Affairs Policy and Planning Requirements for Emergencies
  - DOE Order 1700.1, Freedom of Information Program

- b. Identify the various internal and external groups with whom environmental restoration personnel must interface.
- c. Describe the different types of media that may be utilized to communicate with the various internal and external groups, and discuss the advantages and disadvantages of each type.
- d. Discuss the purpose of the Environmental Management public participation policy and process and its relationship to environmental functions.

**4.7 Environmental restoration personnel shall demonstrate a working level knowledge of assessment techniques (such as the planning and use of observations, interviews, and document reviews) to assess project performance, report results of assessments, and follow up on actions taken as the result of assessments.**

Supporting Knowledge and/or Skills

- a. Describe the environmental restoration personnel's role with respect to oversight.
- b. Describe the assessment requirements and limitations associated with the environmental restoration personnel's interface with contractor employees.
- c. Explain the essential elements of a performance-based assessment including the areas of investigation, fact finding, and reporting.
- d. Describe the contents of an assessment report.

- e. Explain the significance of each of the following assessment-related activities:
  - Exit interviews
  - Closure process
  - Tracking to closure
  - Follow-up
  - Corrective action plans
  - Surveillance
  - Walk-down
  - Assessment
- f. Participate in formal meetings between Department management and contractor management to discuss results of environmental restoration assessments.

**4.8 Environmental restoration personnel shall demonstrate a familiarity level knowledge of the following Department of Energy (DOE) Orders sufficient to conduct independent assessment of contractor and/or Federal employee work activities:**

- **DOE Order 5480.19, Conduct of Operations Requirements for DOE Facilities**
- **DOE Order 5480.20, Personnel Selection, Qualification, Training, and Staffing Requirements at Department of Energy Reactor and Non-reactor Facilities**
- **DOE Order 5480.31, Start-Up and Restart of Nuclear Facilities**
- **Radiological Control Manual**

Supporting Knowledge and/or Skills

- a. Describe the requirements of Chapters I, IV, VI, VII of DOE Order 5480.19, Conduct of Operations Requirements for DOE Facilities.
- b. Describe the training and qualification requirements found in Chapter I of DOE Order 5480.20, Personnel Selection, Qualification, Training, and Staffing Requirements at Department of Energy Reactor and Non-reactor Facilities.
- c. Describe the general requirements of DOE Order 5480.31, Start-Up and Restart of Nuclear Facilities.
- d. Describe the requirements of the Radiological Control Manual as they apply to environmental restoration activities.
- e. Conduct a minimum of three assessments of contractor or Federal employee work performance.

**4.9 Environmental restoration personnel shall demonstrate a working level knowledge of contract policy and requirements documents sufficient to describe their application to environmental restoration activities.**

Supporting Knowledge and/or Skills

- a. Describe the roles and responsibilities of the environmental restoration personnel, and discuss the purpose for, and the primary provisions of, the following contract policy and requirements documents:
- Department of Energy Acquisition Regulations
  - Federal Acquisition Regulations
  - DOE Order 4210.1C, Designation of Source Selection Officials
  - DOE Order 4210.5A, Operating and On-Site Services Contract Extend or Compete Decisions
  - DOE Order 4220.4, Organizational Conflict of Interest Processing Procedures.
  - DOE Order 4240.1K, Designation of Major Systems Acquisitions and Major Projects
  - DOE Order 4250.1A, Small Business/Labor Surplus Area Set-Aside and 8(a) Program Review Procedures

**4.10 Environmental restoration personnel shall demonstrate a working knowledge of problem analysis principles and techniques necessary to identify problems, determine potential causes of the problems, and identify corrective action(s); as described in Department of Energy (DOE) Order 4010.1, Value Engineering, and Office of Management and Budget (OMB) Circular A-131.**

Supporting Knowledge and/or Skills

- a. Describe and explain the application of problem analysis techniques, including the following:
- Root Cause Analysis
  - Causal Factor Analysis
  - Change Analysis
  - Barrier Analysis
  - Management Oversight Risk Tree Analysis
- b. Describe and explain the application of the following root cause analysis processes in the performance of occurrence investigations:
- Events and Causal Factors Charting
  - Root Cause Coding
  - Recommendation Generation

- c. Describe the following types of investigations and discuss an example of the application of each:
  - Type A
  - Type B
  - Type C

**4.11 Environmental restoration personnel shall demonstrate a working level knowledge of the training and qualification requirements for defense nuclear facility personnel as described in Department of Energy (DOE) Order 5480.20A, Personnel Selection, Qualification, Training and Staffing Requirements at Department of Energy Reactor and Non-Reactor Nuclear Facilities.**

Supporting Knowledge and/or Skills

- a. Describe the five elements of a systematic approach to training.
- b. Discuss the relationship between training, risk, and safe facility operations.
- c. Discuss key elements of an effective on-the-job training program.

## **EVALUATION REQUIREMENTS**

The following requirements shall be met to complete the Department-wide Environmental Restoration Functional Area Qualification Standard. The evaluation process identified below serves as a measurement tool for assessing whether the participants have acquired the technical competencies outlined in this Standard.

1. Documented completion of the Department-wide General Technical Base Qualification Standard in accordance with the requirements contained in that standard.
2. Documented completion of the competency requirements listed in this Functional Area Qualification Standard. Documentation of the successful completion of these competency requirements may be satisfied by a qualifying official using any of the following methods:
  - Documented evaluation of equivalencies
  - Written examination
  - Documented oral evaluation
  - Documented observation of performance

## **CONTINUING TRAINING AND PROFICIENCY REQUIREMENTS**

Environmental restoration personnel shall participate in an Office/facility/position-specific continuing training and qualification program that includes the following elements:

1. Technical education and/or training covering topics directly related to the duties and responsibilities of environmental restoration personnel as determined by line management. This may include courses and/or training provided by:
  - Department of Energy
  - Other Government agencies
  - Outside vendors
  - Educational institutions
2. Training covering topics that address identified deficiencies in the knowledge and/or skills of environmental restoration personnel.
3. Training in areas added to the Environmental Restoration Functional Area Qualification Standard since initial qualification.
4. Specific continuing training requirements shall be documented in Individual Development Plans (IDPs).